

ELFIN/ELFIN-STAR (ELFIN-A/ELFIN-B) – UCLA – 3U+

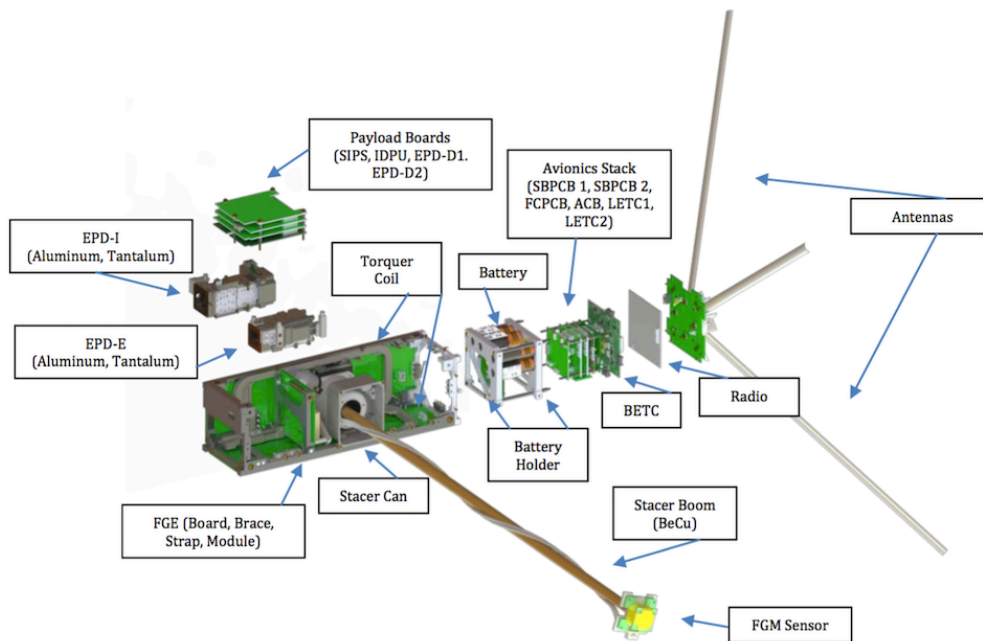


Figure 3: ELFIN Expanded View

Overview: The Electron Losses and Fields Investigation (ELFIN) Mission, is a space weather CubeSat that will investigate the loss of relativistic particles from the radiation belts into the Earth's atmosphere. ELFIN will accomplish this using two primary payload instruments; a fluxgate magnetometer and an energetic particle detector.

CONOPS: Upon deployment from the PPOD, ELFIN will power up and initiate a 45 minute timer counting down for antenna deployment. If tip off rates from the PPOD are large, ELFIN will execute an automatic detumble sequence in order to get the spacecraft in a stable attitude configuration. At 45 minutes, the UHF/VHF antennas will deploy, and the spacecraft will begin beaconing. After communication with the ground is established, spacecraft and instrument commissioning will begin. At a minimum of 2 weeks after deployment, the stacer boom will be commanded to deploy, the spacecraft will be spun up to ~20 rpm, and nominal operations will begin. Science will resume for a minimum of 3 months (nominally 6 months).

Materials: ELFIN's structure is primarily composed of Aluminum 6061-T6, with some peek components as additional structural components. Most materials are standard commercial off the shelf, as well as standard electrical components, printed circuit boards, and solar cells. The Energetic Particle Detector is built with a combination of Aluminum and Tantalum parts. All Tantalum parts are internal components, and are relatively small.

Hazards: There are no pressure vessels or hazardous materials on this satellite.

Batteries: The power system uses 4 Molicel ICR18650J Lithium-ion batteries that are screened by the Aerospace Corporation before delivery to ELFIN. The UL listing number is BBCV2.MH27672.